

# SELF-ALIGNING ULTRASONIC DISPLACEMENT SENSOR SYSTEM, APPARATUS AND METHOD FOR DETECTING SURFACE VIBRATIONS

## Abstract of Disclosure

Ultrasonic transducing elements (11, 12) are used to measure vibrations of a nearby musical drumhead or other vibrating surface (13). A first ultrasonic transducer (11) emits an ultrasonic signal (14) and a second ultrasonic transducer (12) listens for an echo of that signal (14). A *phase change* of the echoed (reflected) signal (202) is compared to a reference signal (206) to create a representation signal (216) which represents the movement of the drumhead or other vibrating surface (13). For this comparison to be properly made, a deviation signal (220) is generated that defines an average deviation of the reference signal (206) from optimum, which is then used to *self-align* the reference signal (206) to the reflected signal (202).

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